DOCUMENT RESUME

ED 139 146 EC 100 721

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TITLE A Methodology for Validating Placement of Children in Exceptional Child Programs.
PUB DATE Apr 77
NOTE 19p.; Paper presented at the Annual International Convention, The Council for Exceptional Children (55th, Atlanta, Georgia, April 11-15, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Criterion Referenced Tests; *Educable Mentally Handicapped; Elementary Education; *Emotionally Disturbed; Exceptional Child Research; *Identification; *Learning Disabilities; Longitudinal Studies; Mentally Handicapped; *Research Methodology; *Student Placement; Validity

ABSTRACT

A study involving six high risk children (K through grade 2) was conducted to determine the effectiveness of a methodology for validating identification and placement of students diagnosed as educable mentally retarded, specific learning disabled, and emotionally disturbed. The methodology used was criterion-referenced tests in a time-series design; and evidence of the effectiveness of identification and placement was based on two patterns in the data--an increase in the score gains after placement and an abrupt change in the achievement score at the time of placement as well as change in learning rate. Of the six children, five exhibited learning rates after placement that were higher than learning rates prior to placement. (Advantages and disadvantages of the methodology are briefly discussed.) (SBH)

A Methodology for Validating Placement of Children in Exceptional Child Programs

By

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Paper presented at the Council for Exceptional Children,
Atlanta, Georgia
April 13-15, 1977

A Methodology for Validating Placement of Children in Exceptional Child Programs

Placement of children identified as Educable Mentally Retarded or Learning Disabled into specially equipped and staffed educational settings such as self-contained or resource rooms requires additional financial resources that may be justifiably questioned by local funding agencies. A sound research base must be established to justify the additional resources necessary for transfer of exceptional children into special education settings.

Research in the field is frequently restricted by the inability of researchers to assign children randomly to experimental and control groups and the legislative mandates requiring agencies to provide services to all children in need. Other constraints are the inadequacies of non-equivalent control group research designs for populations in which regression and selection are strong threats to internal validity and the lack of sensitivity of commonly administered norm-referenced measures for detecting academic gains in the exceptional child populations.

The evaluation of the Developing Models for Special Education, Title III/IV-C Project encountered all of the previously mentioned limitations in identifying a methodologically-sound evaluation design for determining the effectiveness of the program. The DMSE Project was funded to develop a special education delivery system for the early identification of and intervention with children exhibiting three handicapping exceptionalities, Educable Mentally Retarded, Specific Learning Disabled and Emotionally Disturbed. The target population consisted of K-2 children in an educationally and culturally disadvantaged environment.

Methodology

The methodology determined most feasible for the evaluation of the DMSE project utilized criterion-referenced tests in a time-series design. The basic approach involved the establishment of individual behavioral baselines defined by performance objectives with experimental replications across individuals. Use of this methodology determined the effects of identification and intervention on the children entering the exceptional child services system during the 1975-1976 academic year.

Prior to the beginning of school, thirty-seven high-risk candidates for the program were identified by project personnel on the basis of pre-school screening, group achievement and group IQ data. Three alternate forms of a criterion-referenced test were developed to measure randomly selected academic behavioral objectives identified by teachers to be taught to the target population and to regular classroom K-2 children over the course of the 1975-1976 academic year. These tests were administered monthly by project personnel on an individual basis to the 37 high-risk candidates. Learner performance on the alternate forms was recorded prior to and subsequent to identification and placement. If the identification and intervention process was effective, the performance of handicapped children subsequent to placement would be superior to performance prior to placement.

The evaluation design for the project was as follows:

$$O_1 \quad O_2 \quad O_3 \quad O_4 \quad O_5 \quad O_6 \quad O_7 \quad O_8$$

with X_i (placement) occurring anywhere between O_2 and O_7 depending upon progress of the individuals through the system. Thus, testing occasions were pre-set and equally spaced but the application of the treatment was case-specific instead of predetermined as in a typical time-series design.

Two patterns in the data were to be accepted as evidence of the effectiveness of identification and placement. First, a change in the rate of learning progress as demonstrated by an increase in the score gains after placement would indicate a beneficial placement for the child. Figure 1 presents a hypothetical learning pattern demonstrating learning rate change. Second, an abrupt change in the achievement score at the time of placement as well as a change in learning rate would indicate an advantage for the child in placement. Figure 2 presents a hypothetical learning pattern demonstrating an abrupt change at the time of placement in conjunction with a learning rate change. Obviously, the most ideal learning pattern would be one that exhibited both a shift in rate and an abrupt change upon placement.

Test Development

The three alternate forms of a criterion-referenced test were based on objectives to be taught in kindergarten, first grade, second grade, and exceptional child programs. Objectives drawn from the county list of objectives and from the Santa Cruz Behavioral Characteristics Progression Chart were reviewed by the teachers. Approximately 25% of the objectives on which consensus was obtained were randomly selected to be included on the tests. Each consensual objective was directly measured on each of the three alternate forms of the test. Most of the objectives for the target population were very fundamental with fairly restricted parameters for item construction. Objectives and corresponding items were presented to two external judges to provide a check on the validity of the items used in the evaluation.

The method of determining the reliability of the items used in the evaluation was multiple observations of the testing of individual pupils and consisted of agreement between observers. Consistency of agreement

was examined during the field testing of the instrument. Ninety-six percent of the multiple observations (133/138) resulted in 100% agreement among the four observers.

An index of internal consistency was computed for the first form of the test (KR-20) which had a value of .99. This value is extremely high for the index, which ranges from .00 to 1.00. The index, however, is sensitive to increases in the number of items included on the test and to wide differences in the testing population. With 118 items on the test and a range of EMR-five year-olds to ED seven-year-olds, one would expect a high degree of discrimination.

Correlations were calculated among the first four administrations of the test in order to estimate the reliability of the three alternative forms that were developed. These correlations are underestimates of the true reliability that exists among the measures since in each case a month elapsed between administrations during which time changes were anticipated in the performance of students. The correlations were: .988, .989, and .984.

Results and Discussion

Of the 37 high-risk children, six were actually placed in exceptional child settings during the school year. Two methods of analyzing the data were presented. First, examination of the raw scores plotted against testing time visually demonstrated the effect of identification and placement for each child. Second, regression-discontinuity was employed as an alternative to visual analysis. For each child best-fitting lines were calculated for the pre- and post-placement scores. Comparisons were made of the slopes and intercepts of the lines prior to and following placement.

Table 1 presents the individual scores on the achievement measure. Figures 3-8 present by case numbers the individual achievement profiles developed to demonstrate visually the learning performance exhibited during the 1975-1976 academic year.

Table 1
Individual Scores for Children Placed during 1975-1976

Testing Period	Case Number					
	1	2	3	4	5	6
1	3	14	80	64	78	46
2	1	20	77	68	86	46
3	2	23	82	74	NT[a]	48
4	2	18	84	79	81	50
5	2	23	81	80	84	59
6	---[b] 5	28	89	86	85	51
7	6	28	86	86	85	57
8	8	26	90	93	86	58

[a] NT indicates not tested

[b] --- indicates time of placement

Table 2 presents for each case the intervention intercepts and the slopes of regression lines calculated on date points prior to placement and following placement.

Table 2
Intervention Intercepts and Slopes Of Regression Lines
Prior To And Following Placement

Case Number	Intervention Intercepts		Regression Line Slopes	
	Prior to Placement	Following Placement	Prior to Placement	Following Placement
1	2.49	2.91 *	.023	.432*
2	22.39	18.245	.534	.639*
3	80.09	81.06 *	.119	.356*
4	80.35	80.29	.954	.748
5	83.00	81.64	.165	.262*
6	49.02	50.29 *	.282	.433*

*Increase in favor of placement

Of the six children examined through the evaluation, five children (Cases 1, 2; 3, 5, and 6) exhibited learning rates after placement that were higher than learning rates prior to placement. One of these five cases showed dramatic improvement following placement (Case 1). These learning rate increased indicate that the children were progressing at a faster rate following placement than before placement and validates the placement of the children in the exceptional child setting.

Two of the six children (Cases 2 and 5) exhibited a decrease in the interception of the intervention line following placement in the exceptional child program. For both of these learners placement occurred immediately following the Christmas vacation of two weeks. The time without instruction may have caused the depressed achievement scores. Another possible explanation might be that the learners had difficulty adjusting to the changes in environment caused by the placement. Case 2, however, did not exhibit low adaptive behavior.

Two cases (Cases 3 and 5) had high rates of absenteeism. The absenteeism probably contributed to the fluctuation in the data points as well as to a depression of the total achievement scores.

Advantages of the Methodology

Several advantages of the methodology were noted at the conclusion of the study. First, the time-series design was particularly appropriate for research or evaluation in special education where random assignment of children is seldom possible, and the possibility of regression effects very strong. The time-series design controls all threats to internal validity except history. Utilizing the design repeatedly on an individual basis with the treatment introduced at different times, increases the credibility of concluding that the treatment and not other factors accounted for changes in the performance of the children.

The second advantage noted was the longitudinal data provided in the study. Typical research designs provide single measures prior to and following treatment. Collecting data on a monthly basis provided an indication of academic performance throughout the year. Individual learning profiles could be examined to determine the effects of significant events such as vacations, absenteeism, or known emotional distress, as well as the treatment effects.

An additional benefit of the methodology was the use of criterion-referenced measures. A common criticism of research studies is that the measures used did not adequately reflect the teaching program in their school system. The development of a criterion-referenced test based on local objectives, ensured the validity of the measure for the population being tested.

The fourth advantage of the methodology was the utility of the data for purposes other than research or evaluation. The individual profiles provided supplemental information on academic performance which could be helpful in making placement decisions for the following year.

The major disadvantage of the methodology as the time involved in the administration of the measures. Administration of the test required an average of 30 minutes. For the 37 high-risk children tested, an average of 18.5 man-hours per month was devoted to the administration alone. When preparation and logistics were included in the time estimates, a more realistic figure of 40 man-hours per month was derived for the completion of the testing schedule.

The assumptions necessary for interpretation of time-series data was a second problem detected in utilizing this methodology. A major assumption was that the criterion-referenced test scores were equal-interval. Thus, it was necessary to assume that recongnition of the letter K represented the same amount of learning as following a set of directions consisting of four independent activities. Use of regression slopes to analyze the data introduced a second assumption, that the learning rate of the children would be a linear function of time. Although this assumption is readily made by researchers, it may be particularly tenuous in special education where spurts and lulls in learning rates are frequently encountered.

A third disadvantage of the methodology was the difficulty in summarizing data over children. Since treatment was introduced at different times for all six of the children, summarization presented severe problems. Although the data could have been summarized by aligning treatments for each of the six cases, the resulting realignment of observations prior to and following placement produces missing data cells that make analysis questionable. If a sufficient number of children were placed between any set of two observations, summarization might be feasible.

Although the number of cases in the DMSE evaluation was too small to provide conclusive evidence, the methodology appeared to be

sufficiently feasible and sensitive to detect academic growth resulting from placement in exceptional child programs. Further studies of this nature should be conducted to justify the additional resources needed to maintain exceptional child education.

Figure 1

Hypothetical Achievement Profile of
a Shift in Learning Rate

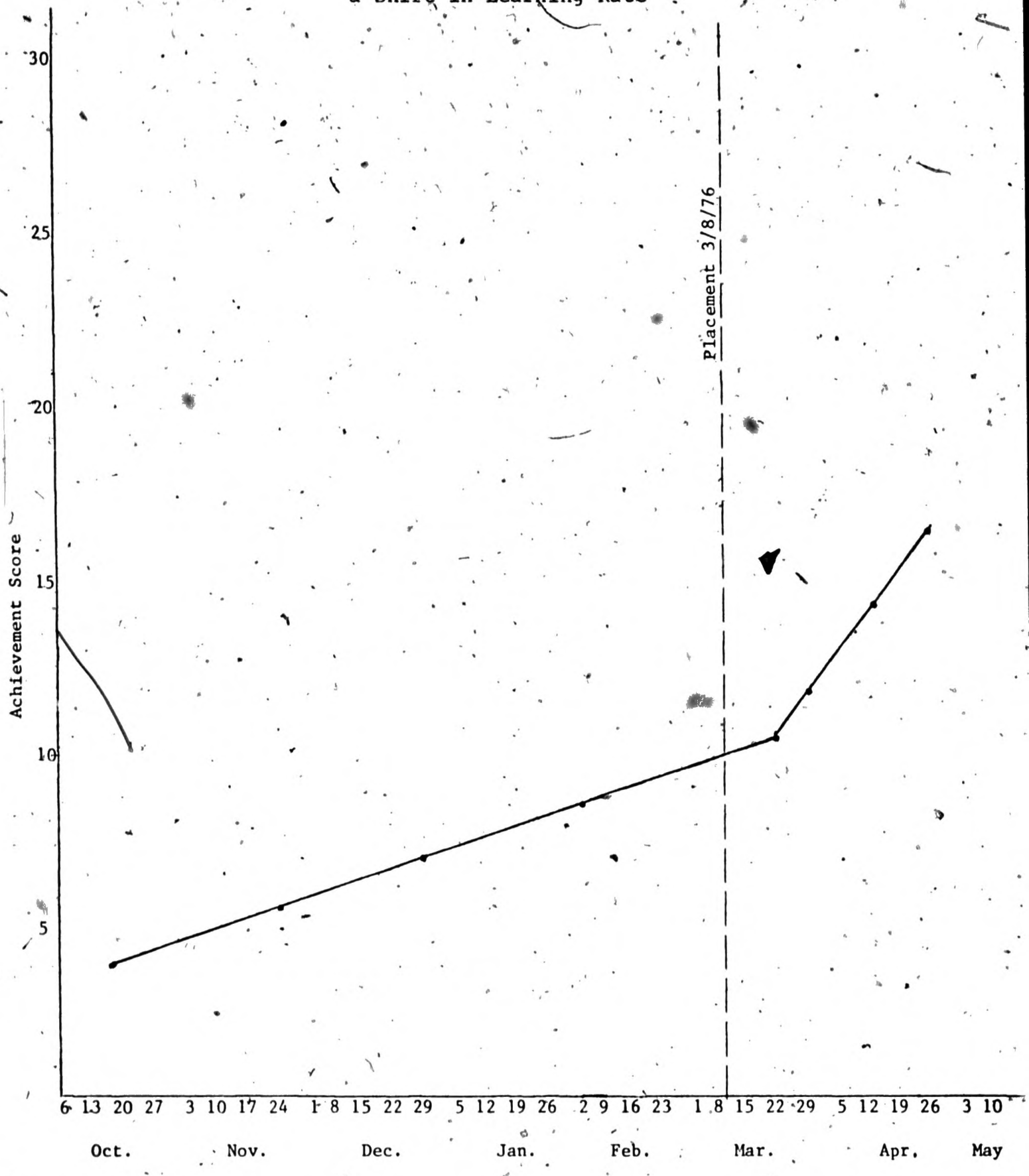

Figure 2

Hypothetical Achievement Profile of an Abrupt Change at the Time of Placement and a Shift in Learning Rate

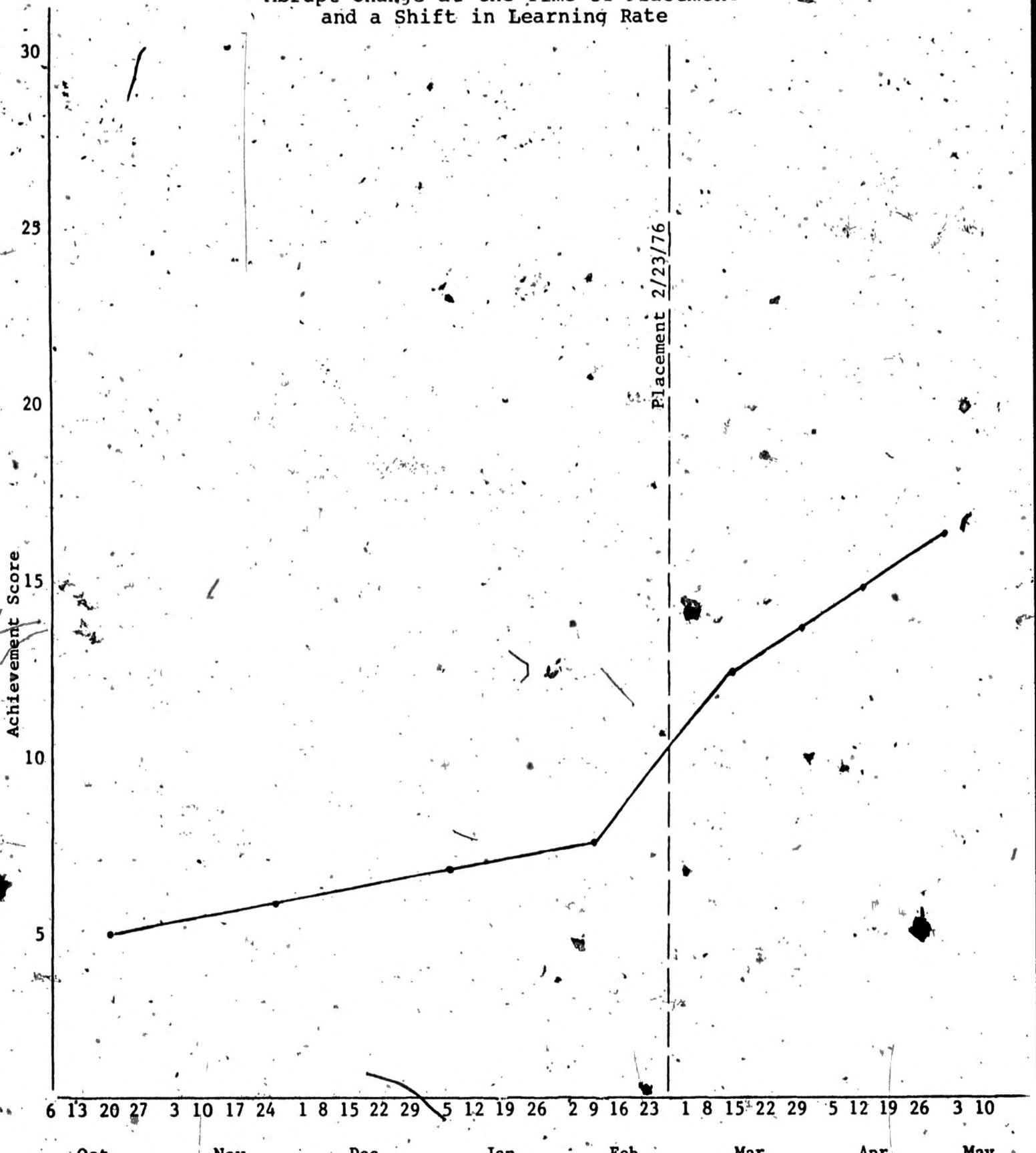

Figure 3

Achievement Profile for Case 1

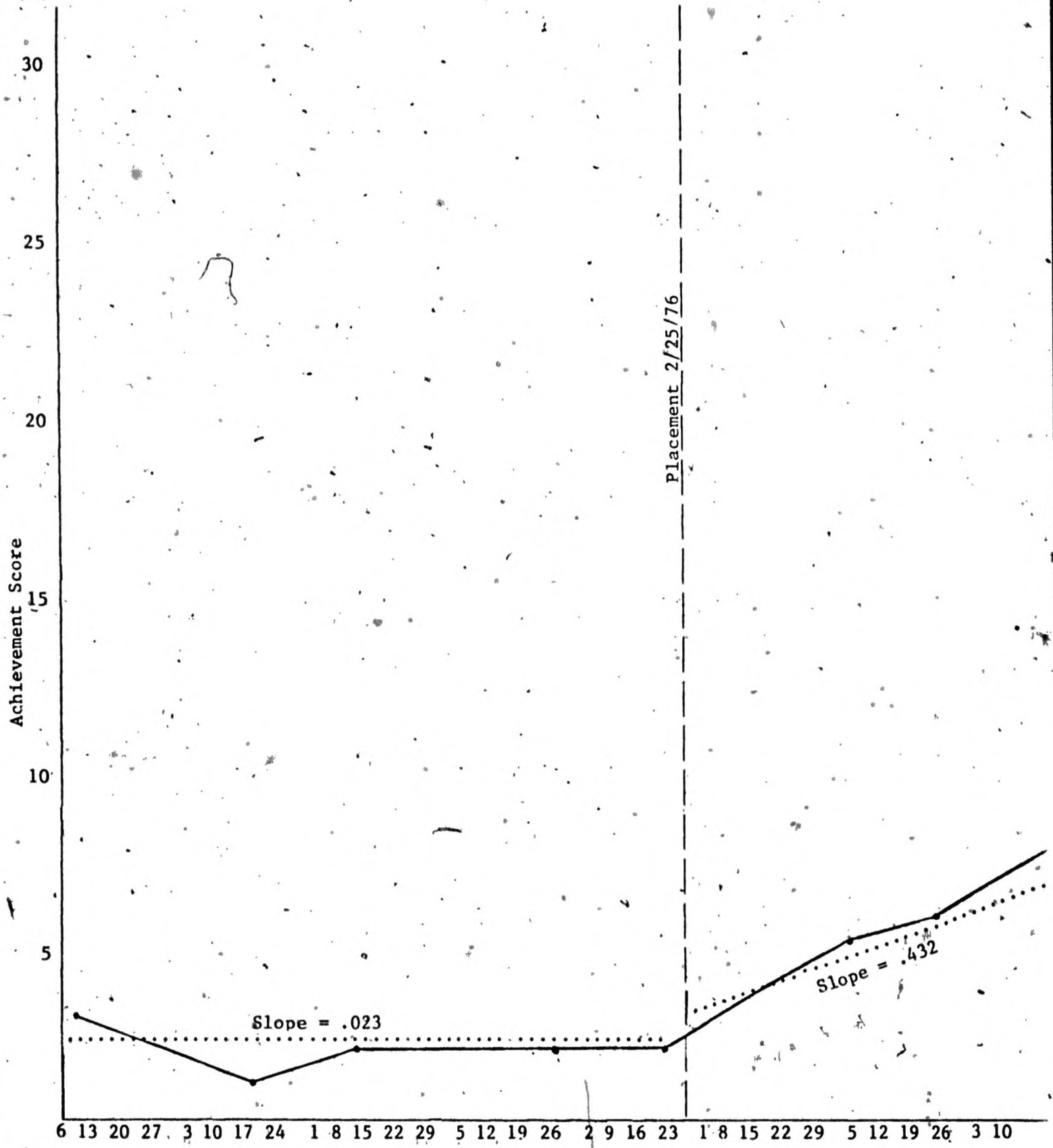

Figure 4

Achievement Profile for Case 2

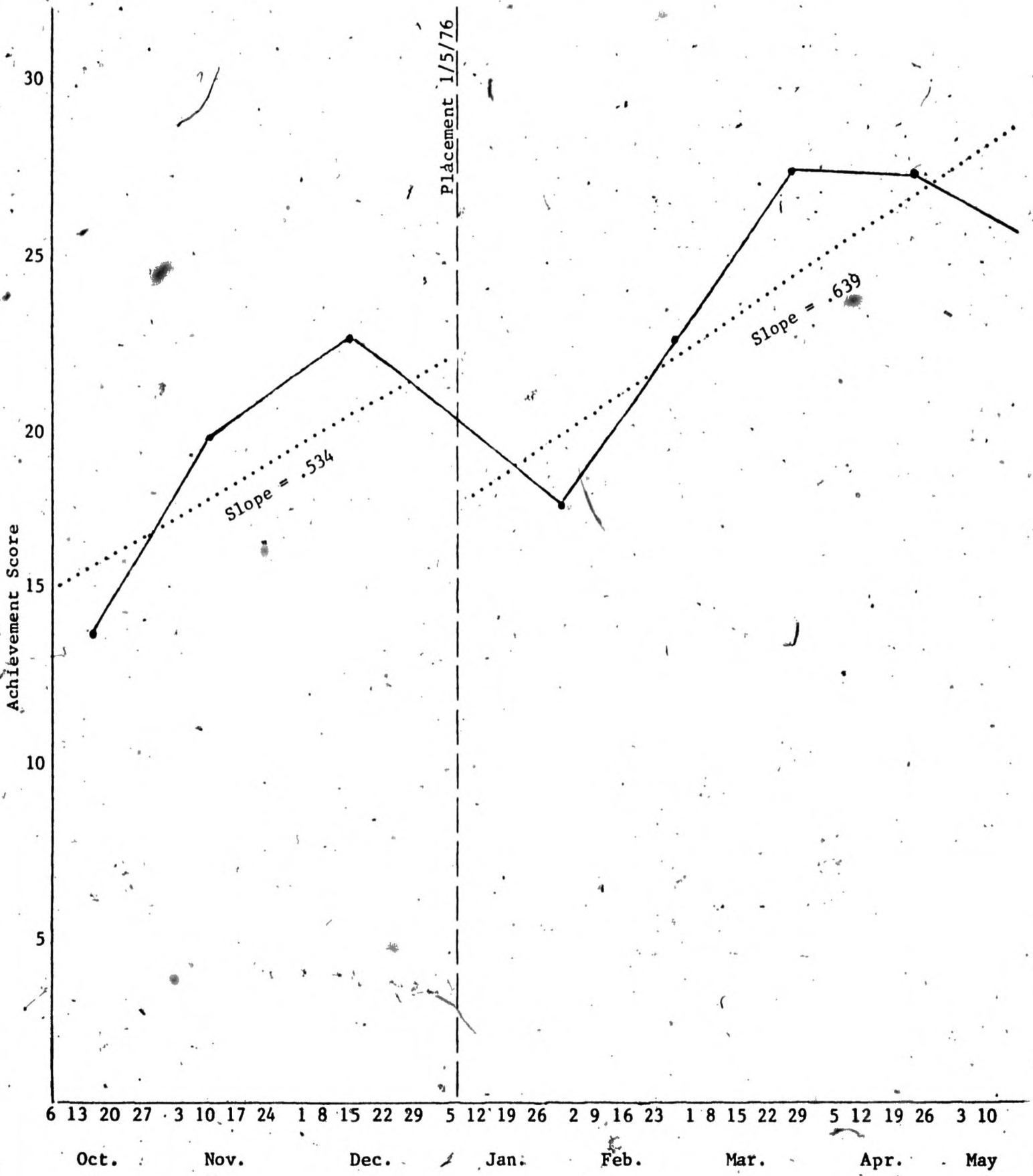

Figure 5

Achievement Profile for Case 3

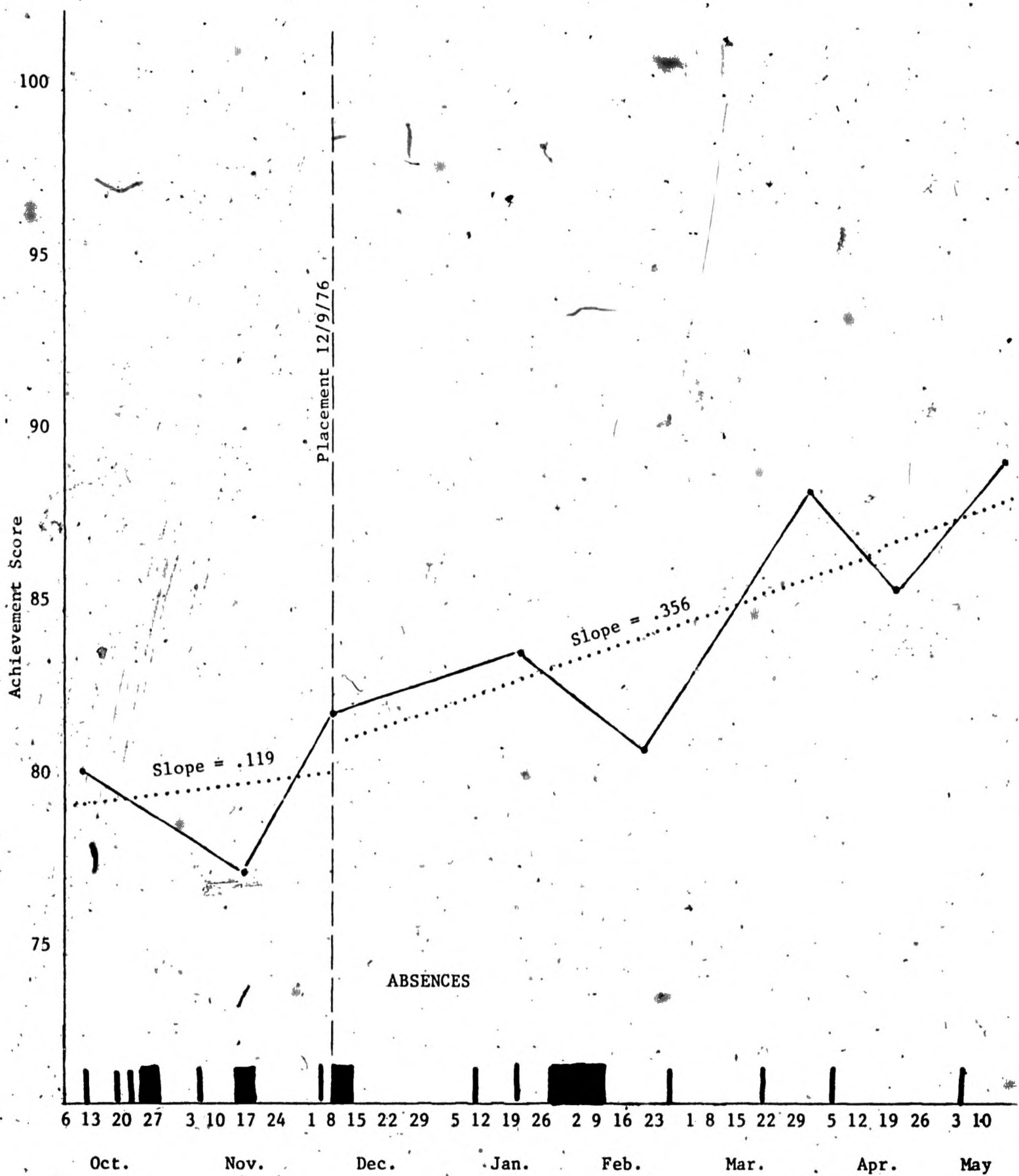

Figure 6

Achievement Profile for Case 4

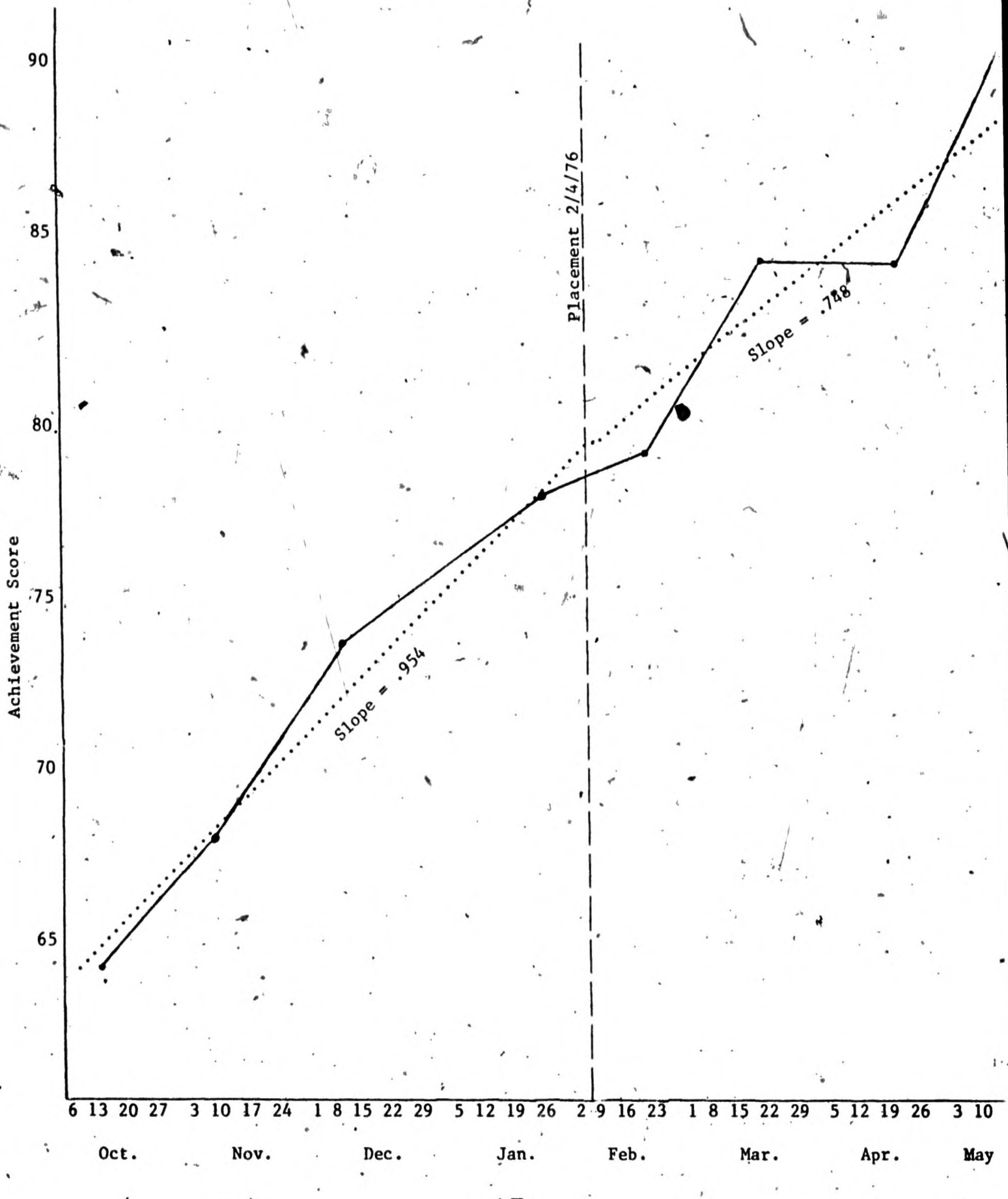

Figure 7

Achievement Profile for Case 5

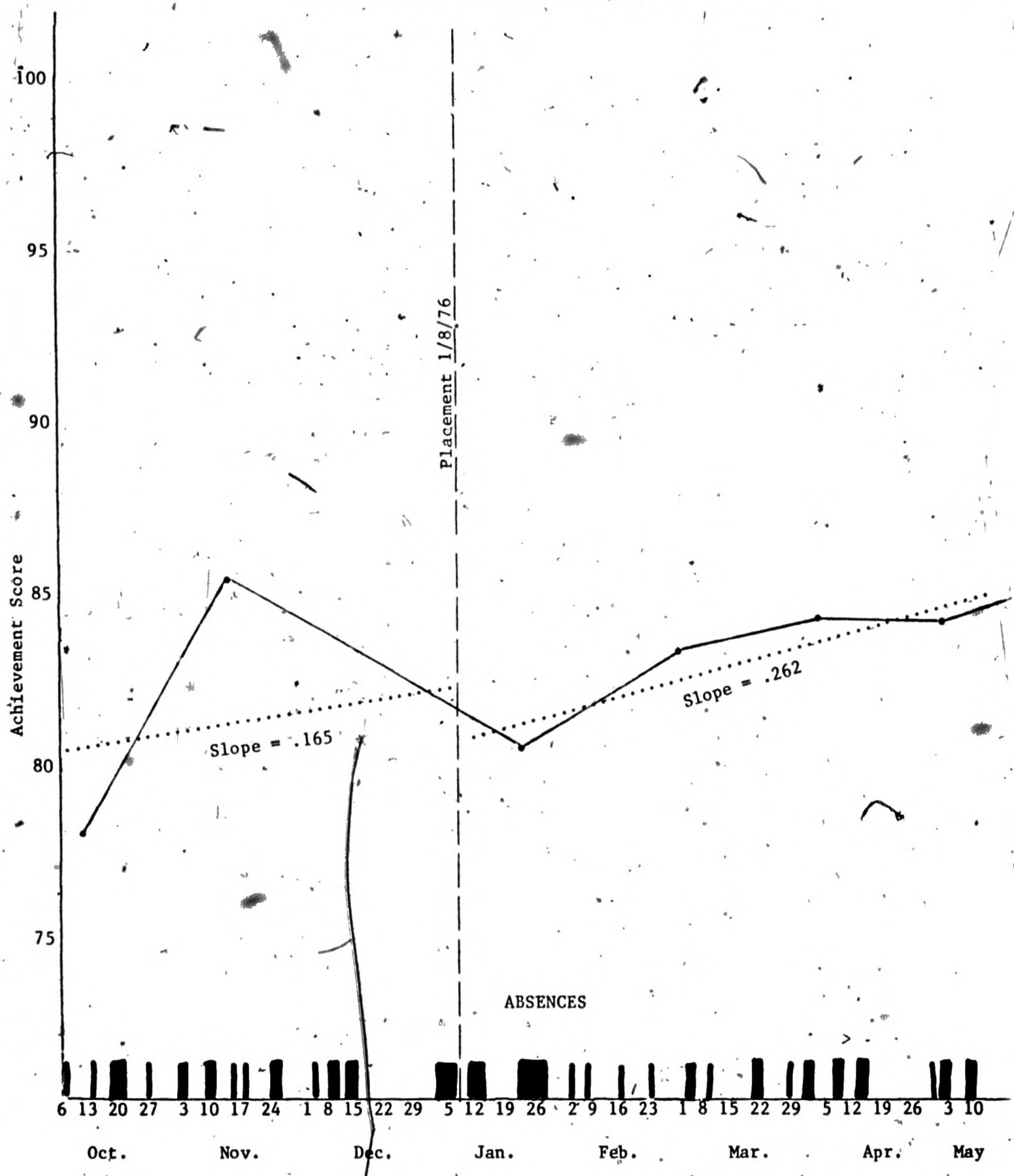

Figure 8

Achievement Profile for Case 6